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WALDSEEMÜLLER, MARTIN.—*Cosmographiæ Introductio* of . . . in facsimile. Followed by the Four Voyages of Amerigo Vespucci, with their Translation into English; to which are added Waldseemüller's Two World Maps of 1507. With an Introduction by Prof. Joseph Fischer, S.J., and Franz von Wieser. Edited by Charles George Herbemann, Ph.D. [4 Plates.] New York, United States Catholic Historical Society. 1907. Sm. 4to.

WORKMAN, WILLIAM HUNTER.—Some Altitude Effects at Camps above Twenty Thousand Feet. [3 illustrations.] *Reprinted from Appalachia, Vol. XI, June, 1908. No. 4.* pr. 8vo [Gift from the Author.]

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## BOOK NOTICES.

**La Science Séismologique. Les tremblements de terre. By Count Montessus de Ballore. With a Preface by E. Suess.** 222 figures and maps. Paris, Armand Colin, 1907. (Pr. 16 fr.)

After having traced, in his "*Géographie Séismologique*," the causal relations between earthquakes and geological conditions, the author has given us in this book a treatise on the nature and character of earthquakes as physical phenomena, a physical seismology, so to speak, as compared with the tectonic or genetic seismology of the earlier book. In view, however, of the important influence of seismic movements on geological conditions, and *vice versa*, the author insists that this division of labour which assigns the study of the physical aspects of the phenomenon to the physicist, and that of the geological aspects to the geologist, should never be carried so far as to involve an absolute separation between the work of these two classes of scientists. Many of the difficulties which the purely physical explanation of earthquake problems have encountered may be safely laid at the door of this fatal separation. The purely physico-mathematical treatment deals with the seismic movement as if it were an ideal energy propagated according to strictly mathematical laws in a mathematically ideal medium, which results in a mere semblance of exactness that corresponds neither to actual conditions nor even to the present status of science.

Every natural science, during the successive phases which constitute its evolution, has been dominated by certain paramount theories which, in the course of time, have been replaced by others more in accordance with newer observations. In seismology the epicentrum must, according to the author, now be classed with such. The greater perfection with which instrumental work in seismology has been carried on in recent years has revealed too many discrepancies between this theory and actual observations which, if not perfectly adjusted, are at least accounted for as soon as the theory of an epicentrum is given up. Instead of looking for a local centre of the disturbance, a definition more in accordance with modern observations would characterize the seismic movement rather as a "*mouvement d'ensemble*," e. g., a derangement or displacement of a whole portion of the earth's crust, of tectonic character, and originating at far lesser depths than those required by mathematical speculation based on the supposed existence of an epicentrum. While with regard to quakes of volcanic origin and those due to caving in ("*tremblements d'écroulement*," "*Einsturzbeben*"), the explanation

by means of an epicentrum, in the original meaning of the word, may be retained. In all other cases the term can now be used only in a conventional way to designate the region of the origin of the disturbance.

In his own treatment of the questions involved the author strictly adheres to the method of his earlier work, namely, of placing observations foremost and deducting his conclusions from them: "Les théories passent, les observations restent." In this way he takes up, after an historical introduction, first, the study of macroseisms or "direct seismological observations." He discusses the accepted facts and theories of intensity, direction, epicentrum and focus, tremors, seismic noises, marine quakes, and relations of earthquakes to other natural phenomena. The second part, on microseisms or "instrumental seismology," compares the merits of the various seismographs, of seismogrammic records, the relations of the seismic movement to the interior of the globe, and the character of the microseismic movement. The megaseisms, or "applied seismology," constitute the third part, and here the author discusses the geological effects of earthquakes, the action of earthquakes on the different building materials, and earthquake-proof architecture. By a comparative study of the works of the leading specialists on each of these numerous subjects, in the light of his own comprehensive material and experience, the author has given a perfect presentation of the present status of this science, emphasizing over and over again the need for more and trustworthy observations as a foundation for further wholesome progress, and asking for a critical revision of a number of theories sanctioned by scientific tradition, for which unquestionable proof has not yet been furnished and which, upon re-examination, might be found to be as fallacious as was the theory of the epicentrum.

In this way the book combines the three distinctive merits of a catalogue of the most important earthquakes, a reference work on seismic literature in all its branches, and a perfect cyclopedia of seismology as a science. Whoever is going to take up work along any of its lines will find in it, not only all that has been done before, but also an abundance of suggestions as to the direction in which his efforts may prove most successful. Certainly, after the publication of this volume, France can no longer be accused of not having contributed her share toward the promotion of seismic studies.

M. K. G.

**The Geology of the Cromwell Subdivision, Western Otago Division. Bulletin No. 5 (New Series). By James Park, New Zealand Geological Survey, Department of Mines, Wellington, New Zealand, 1908.** Pp. viii+92. 20 plates, 10 maps, 6 geological sections, and an index.

The continuance of the excellent work of the New Zealand Geological Survey is expressed in the prompt appearance of new reports dealing with additional areas of that remarkable country. Geologists and geographers have come to expect these reports with an unusual degree of interest, stimulated, no doubt, by the extraordinary variety of land forms and geological structures and conditions which the islands exhibit. New Zealand is indeed a fairly complete epitome of the world's geological and physiographical features and affords a range of phenomena but rarely exceeded by any land area of equal size.

The report before us deals with part of the Western Otago Division in the south central portion of the South Island. The most conspicuous physiographic